



# Fishery Independent Surveys and Datasets

SEDAR Workshop: Caribbean Data  
Evaluation I  
San Juan, Puerto Rico  
26-29 January 2009



# Spiny Lobster

- **SEAMAP-C**
  - PR/VI
  - Larval/post-larval surveys
- **Incidental Observations**
  - **Reef fish surveys**
  - **Benthic surveys**

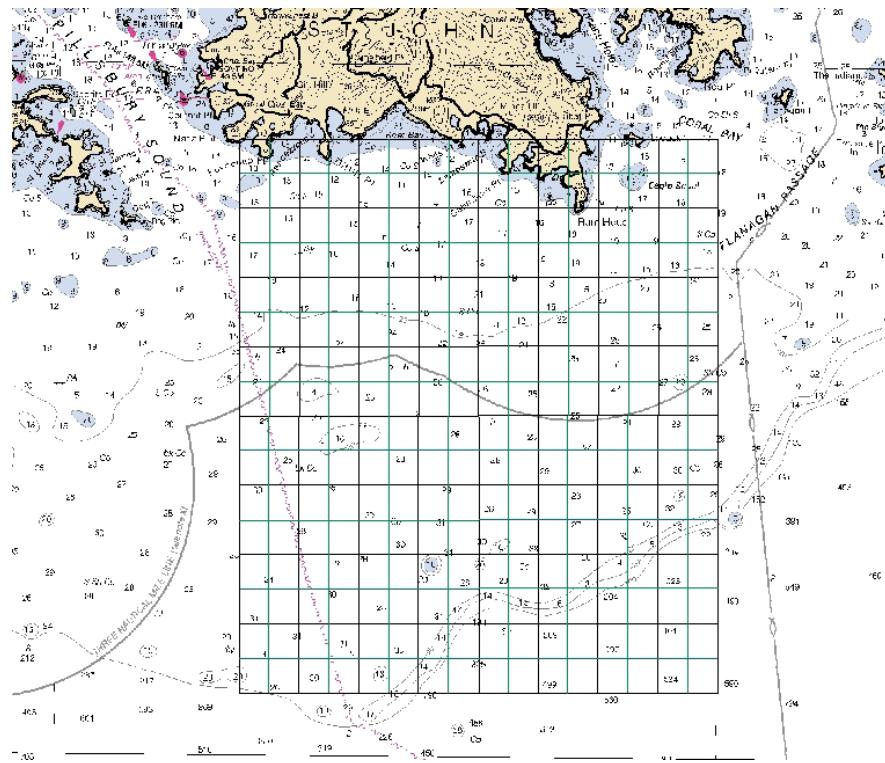
# Queen Conch

- **SEAMAP-C Conch Surveys (more from Nilda)**
  - PR/VI - Every 5 years since 1981 (Wood and Olsen 1983)
  - Permanent transects (expanded); repeated surveys
  - Record conch abundance and size by habitat, depth, and locations
- **NOS Coral Reef Monitoring (reef fish, benthos)**
  - St. John, St. Croix, La Parguera – 2001-2009
  - Stratified (habitats) random samples 25 x 4 m transects
  - Good geographic cover, short temporal sequence
  - Recent PR expansion to Vieques and Jobos Bay
- **Mark and Recapture/Sonic Tracking**
  - St. John - 2005-2009 (2011?)
  - Select bays inside and outside Park and Monument waters
  - Jolly-Seber population estimates, direct measure of minimum F

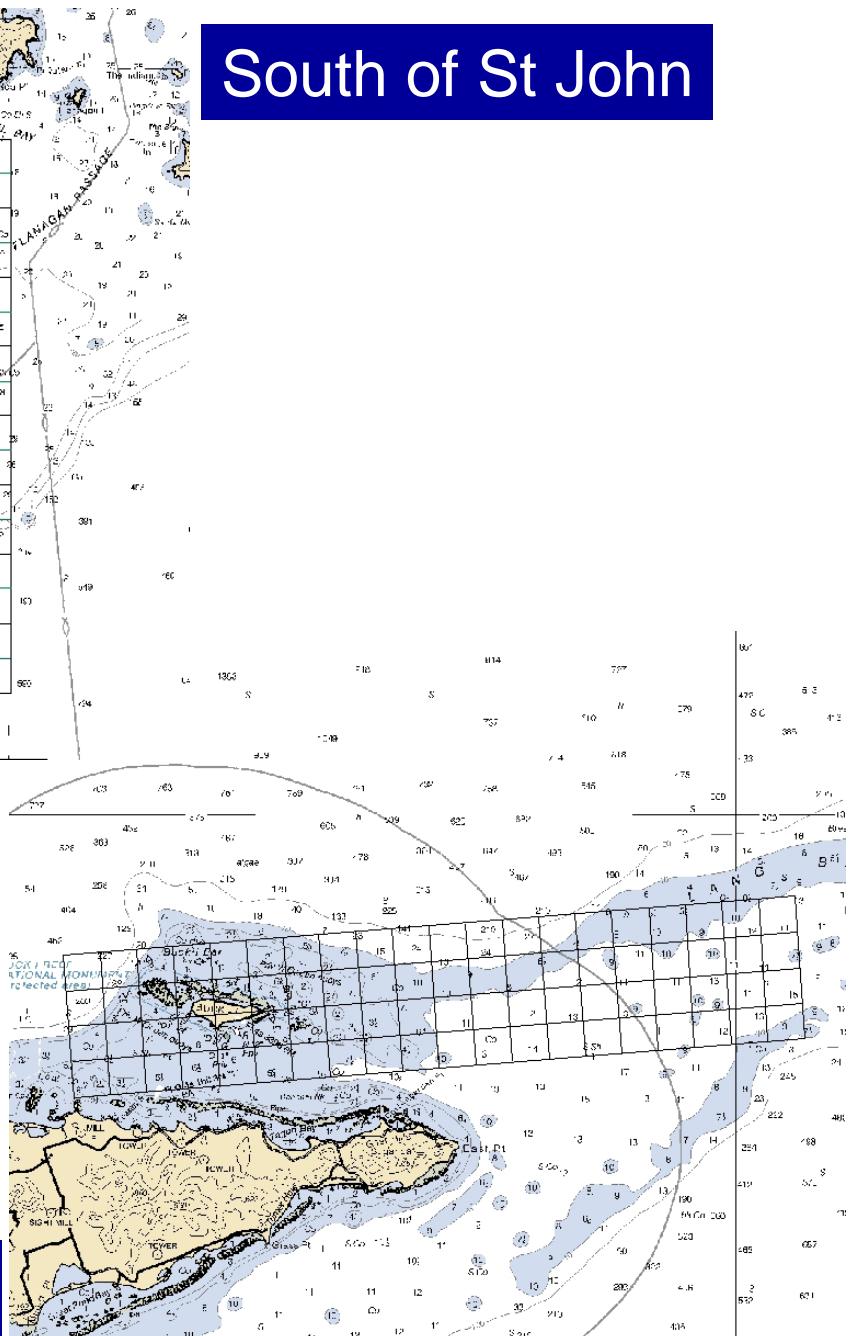
# Reef Fish

- **SEAMAP-C Reef Fish Surveys (more from Nilda)**
  - West PR/ STJ, VI – Trap and hook & line/1988 - present
  - Original design targeted red hind
  - Habitat, depth, and locations recorded
- **VI National Park Monitoring**
  - Friedlander and Beets – 1982 to present
  - St. John and Buck Island, St. Croix
  - Annual surveys (minimum), 18 sites
- **NOS Coral Reef Monitoring (reef fish, benthos)**
  - St. John, St. Croix, La Parguera – 2001-2009
  - Stratified (habitats) random samples 25 x 4 m transects
- **Jurisdiction Coral Reef Monitoring**
  - PR, STT, STX – 2003-2009
  - UVI-Transects, roving diver
  - UPR-Timed transects

# SEAMAP-C Reef Fish Surveys



South of St John



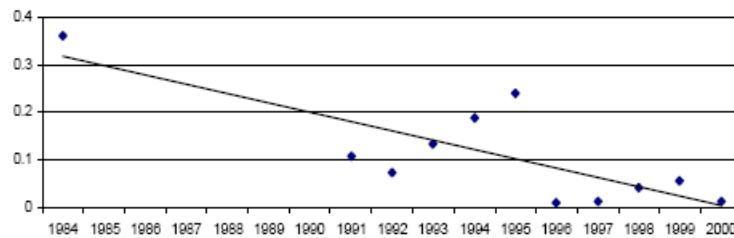
Northeast of St Croix

Table 4. Frequency of each species captured from all gear types in St. Croix in 1993/4 and 2002. Species are ordered according to rank position in 1993/4.

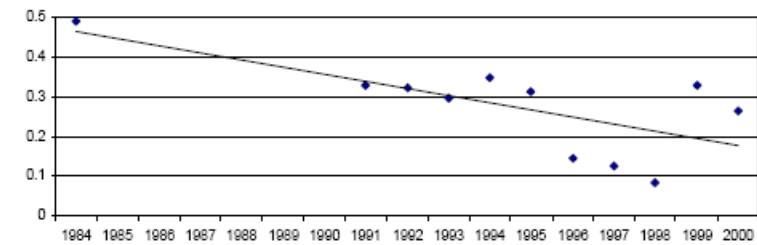
			1993/4			2002	
		Frequency	% Total	Rank	Frequency	% Total	Rank
Coney	<i>Cephalopholis fulva</i>	126	48.65	1	546	65.15	1
Spotted goatfish	<i>Pseudupeneus maculatus</i>	23	8.88	2	1	0.12	19
Sand tilefish	<i>Malacanthus plumieri</i>	20	7.72	3	75	8.95	2
Foureye butterfly	<i>Chaetodon capistratus</i>	19	7.34	4	28	3.34	5
Queen trigger	<i>Balistes vetula</i>	16	6.18	5	6	0.72	13
Ocean surgeonfish	<i>Acanthurus bahianus</i>	7	2.70	6	12	1.43	8
Longspine squirrel	<i>Holocentrus rufus</i>	6	2.32	7	14	1.67	7
Red hind	<i>Epinephelus guttatus</i>	6	2.32	8	46	5.49	3
Yellowtail snapper	<i>Ocyurus chrysus</i>	5	1.93	9	1	0.12	19
Graysby	<i>Cephalopholis cruentatus</i>	4	1.54	10	11	1.31	9
French grunt	<i>Haemulon flavolineatum</i>	4	1.54	10	7	0.84	12
White grunt	<i>Haemulon plumieri</i>	4	1.54	10	2	0.24	16
Squirrelfish	<i>Holocentrus adscensionis</i>	2	0.77	13			
Remora	<i>Remora remora</i>	2	0.77	13			
Blue runner	<i>Caranx cryos</i>	2	0.77	13	38	4.53	4
Redband parrotfish	<i>Sparisoma aurofrenatum</i>	2	0.77	13	1	0.12	19
Lizardfish	<i>Synodus foetens</i>	1	0.39	17			

# VI Natl. Park Reef Fish Surveys

Coney – *Cephalopholis fulva*



Red hind – *Epinephelus guttatus*



Nassau grouper – *E. striatus*

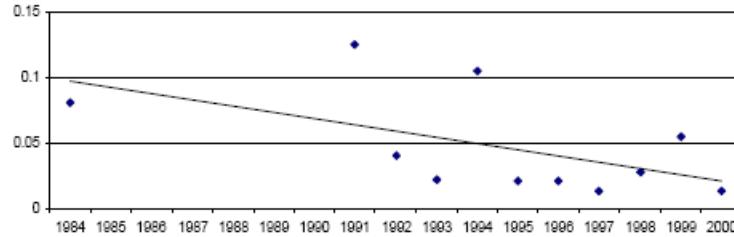
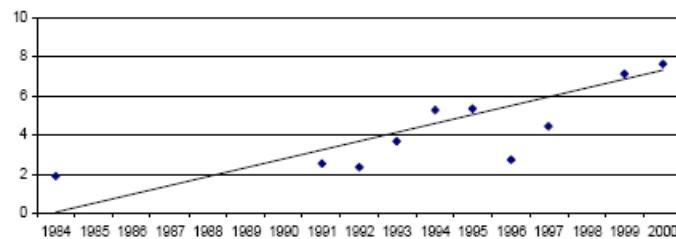


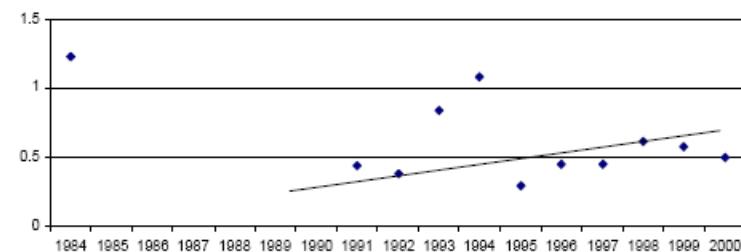
Figure 9. Trends in abundance of three grouper species around St. John, US Virgin Islands, from 1984 to 2000.

# VI Natl. Park Reef Fish Surveys

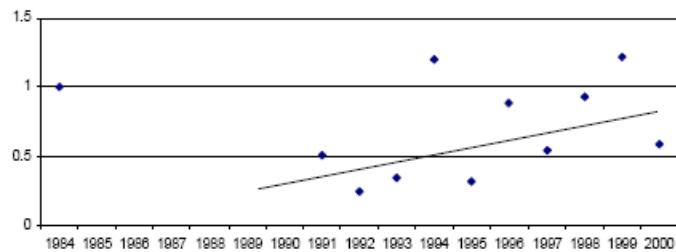
Tomtate grunt – *Haemulon aurolineatum*



White grunt – *H. plumieri*



Bluestriped grunt – *H. sciurus*



Queen triggerfish - *Balistes vetula*

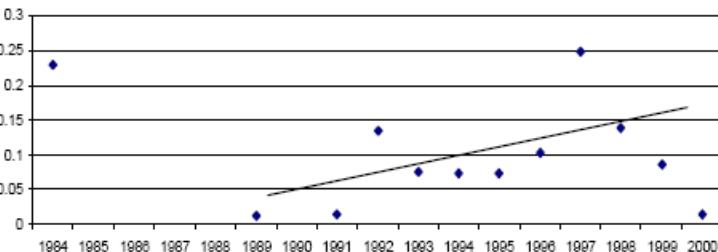


Figure 10. Trends in abundance of three grunt species and queen triggerfish around St. John, US Virgin Islands, from 1984 to 2000.

*Fishery status reports stated that most species were stable or declining in catches (Swingle et al. 1970, Brownell 1972), and symptoms of overfishing were documented, such as the loss of the spawning aggregation of one the most important species in the fishery (Nassau grouper; Olsen and LaPlace 1978). In a fisheries assessment conducted in 1977, Dammann and Sylvester stated that the reef fishery was “nearing or at maximum level of sustainment” and that “future levels of fishing effort cannot be increased without seriously depleting remaining stocks.” In the 1980s, several publications reported declining conditions within the US Virgin Islands fishery. In an analysis of commercial landings data collected in 1984-5 in the US Caribbean [Puerto Rico and US Virgin Islands], Bohnsack et al. (1986) noted the rare occurrence of two target species, which had been documented as common in landings in the 1920s (Nassau grouper and mutton snapper).*

*Rogers and Teytaud (1988) summarized the work conducted prior to 1988 (including the numerous Biosphere Reserve Research Reports, 1984-1987) and concluded that fish populations had declined drastically.*

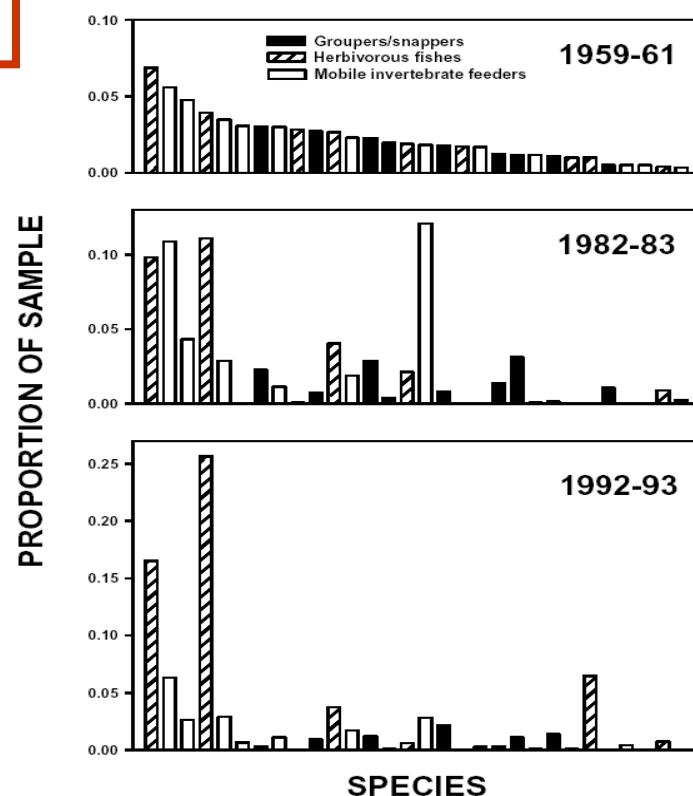
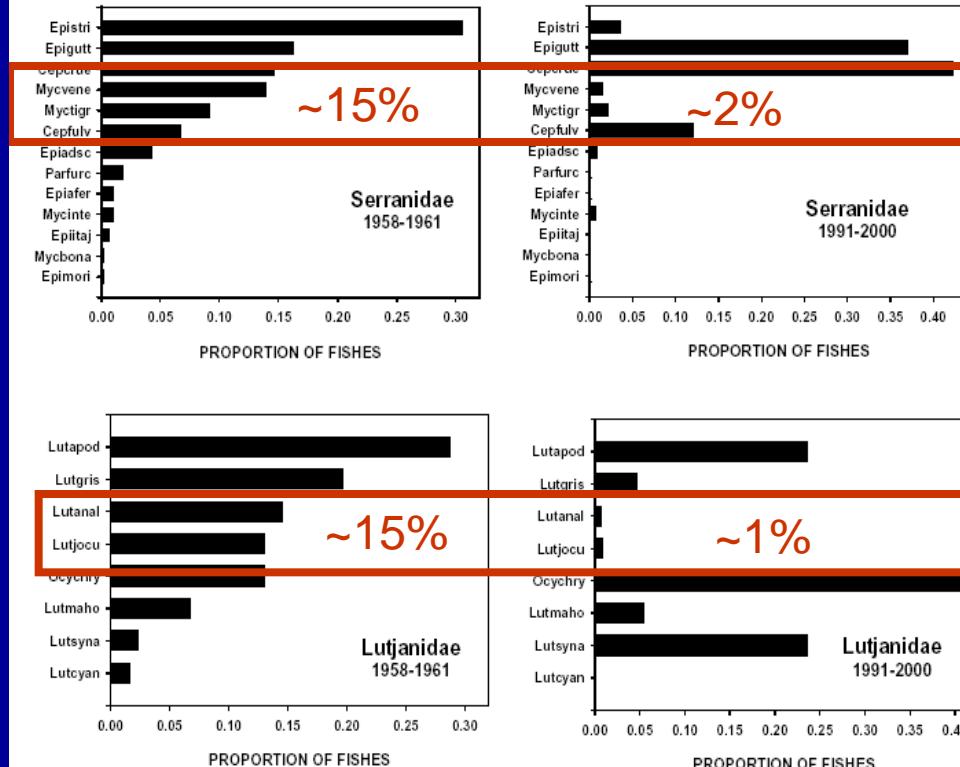
-- **Beets, J. and L. Muehlstein. 2005.** Marine Resource Conditions for Reef Fishes and Seagrass Around St. John, US Virgin Islands: Historical to Present Final Report. NOAA/NOS Grant NA03NOS4260204

**Bohnack, J.A., D.L. Sutherland, A. Brown, D.E. Harper, and D.B. McClellan. 1986.** An analysis of the Caribbean Biostatistical Database for 1985. NOAA/NMFS/Southeast Fisheries Center, Coastal Resources Division, Contribution No. 86/87-10. 35 pp.

**Olsen D.A. and J.A. LaPlace. 1978.** A study of a Virgin Islands grouper fishery based on a breeding aggregation. Proceedings of the Gulf and Caribbean Fisheries Institute 31: 103-141

**Rogers, C.S. and R. Teytaud. 1988.** Marine and terrestrial ecosystems of the Virgin Islands National Park and Biosphere Reserve. Biosphere Reserve Research Report No. 29. U.S. Department of the Interior, National Park Service/Virgin Islands Resource Management Cooperative, 112 pp.

# VI Natl. Park Reef Fish Surveys



# La Parguera, Puerto Rico – 263,600 fish

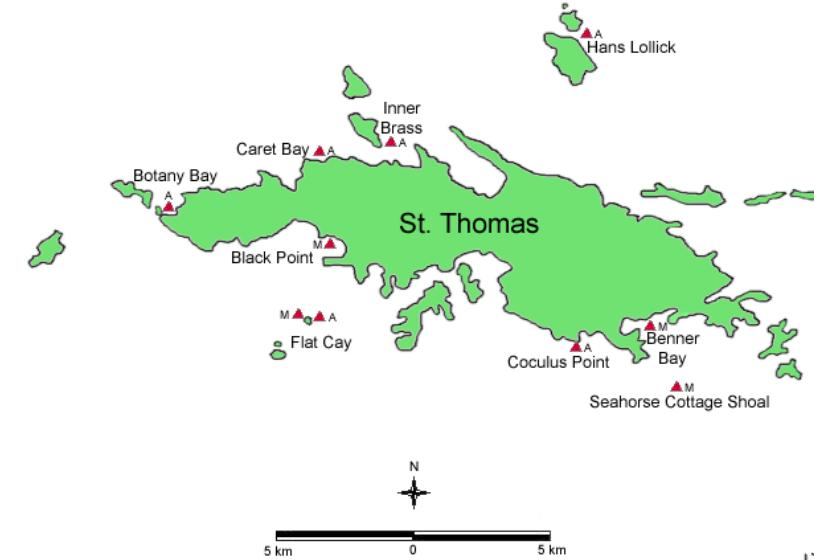
common name	scientific_name	2000	2001	2002	2003	2004	2005	2006	2007	Grand Total
Herring	<i>Jenkinsia UNK</i>	6100	12000	67075	30960	11060	6800	16875	240	151110
Silversides	<i>Atherinomorus UNK</i>		5790	14433						20223
Striped parrotfish	<i>Scarus iseri</i>	159	842	1063	1345	840	854	1071	836	7010
French grunt	<i>Haemulon flavolineatum</i>	480	1222	1643	759	620	709	378	206	6017
Sardines/Herrings	<i>Clupeidae UNK</i>		1000	601	2205	888	203	560	410	5867
Bluehead wrasse	<i>Thalassoma bifasciatum</i>	151	307	1068	780	625	1072	1227	603	5833
Grunts (unknown)	<i>Haemulon UNK</i>	301	269	330	182	903	1304	1543	7	4839
Bicolor damselfish	<i>Stegastes partitus</i>	52	177	504	446	426	751	1316	514	4186
Redband parrotfish	<i>Sparisoma eurofrenatum</i>	58	140	413	457	475	505	765	284	3097
Blue-striped Grunt	<i>Haemulon sciurus</i>	141	472	869	423	148	159	174	72	2458
Beaugregory	<i>Stegastes leucostictus</i>	164	540	488	344	430	230	202	52	2450
Schoolmaster snapper	<i>Lutjanus apodus</i>	244	204	420	326	218	190	398	200	2200
3-spot damselfish	<i>Stegastes planifrons</i>	157	305	553	321	304	242	106	52	2040
Ocean surgeonfish	<i>Acanthurus bahianus</i>	54	160	222	419	224	322	500	138	2039
Slippery dick	<i>Halichoeres bivittatus</i>	48	204	322	462	201	211	363	202	2013
Tomtate	<i>Haemulon aurolineatum</i>	5	77	58	424	475	30	92	803	1964
Yellowhead wrasse	<i>Halichoeres garnoti</i>	26	55	164	266	260	230	579	274	1854
Bridled goby	<i>Coryphopterus glaucofraenum</i>	53	182	352	268	402	260	126	115	1758
Princess parrotfish	<i>Scarus taeniopterus</i>	12	24	87	356	259	334	444	204	1720
Bucktooth parrotfish	<i>Sparisoma radians</i>	49	254	226	625	231	109	68	38	1600
Orangespotted goby	<i>Nes longus</i>		72	189	243	277	374	206	153	1514
Foureye butterflyfish	<i>Chaetodon capistratus</i>	51	105	192	206	216	252	302	160	1484
Dash goby	<i>Ctenogobius saepepallens</i>		187	210	260	96	425	92	35	1305
Stoplight parrotfish	<i>Sparisoma viride</i>	25	137	189	273	198	175	177	118	1292

# St.Croix, VI – 220,890 fish

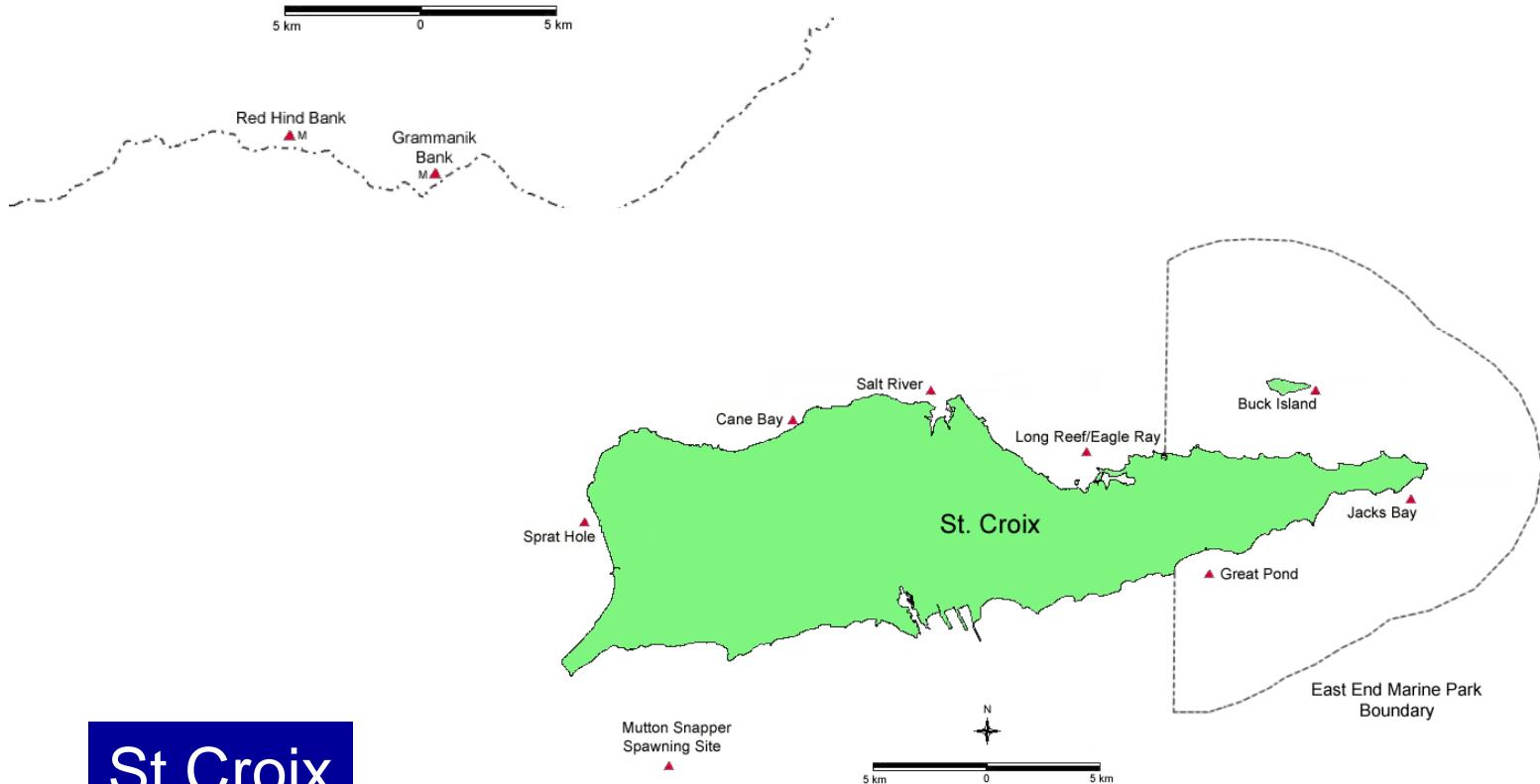
species_name	2001	2002	2003	2004	2005	2006	2007	2008	Grand Total
Acanthurus bahianus	804	846	1799	1211	2173	1768	815	1450	10866
Acanthurus coeruleus	952	1642	1011	1615	1683	1694	918	1313	10828
Sparisoma aurofrenatum	438	586	904	477	1339	1143	654	1085	6626
Scarus iseri	663	1038	1083	709	775	493	367	568	5696
Spalisoma viride	376	318	456	416	487	403	230	345	3031
Haemulon flavolineatum	186	125	671	224	254	484	645	257	2846
Haemulon aurolineatum	13	2383	120	62	10	45	67	113	2813
Scarus taeniopterus	152	172	357	312	306	414	239	251	2203
Carangoides ruber	125	224	369	280	267	470	111	294	2140
Cephalopholis fulva	107	156	308	130	360	330	188	302	1881
Spalisoma radians	165	70	423	263	133	127	201	136	1518
Caranx crysos	40	171	203	262	162	226	9	36	1109
Spalisoma atomarium	80	135	257	149	89	135	62	67	974
Ocyurus chrysurus	65	132	164	77	116	187	76	119	936
Acanthurus chirurgus	187	42	72	119	100	132	107	79	838
Scarus vetula	73	77	74	69	80	116	33	83	605
Haemulon plumieri	9	337	33	25	46	18	25	46	539
Epinephelus guttatus	42	56	60	34	87	100	34	73	486
Sphyraena picudilla	300								300
Balistes vetula	6	22	26	16	44	94	25	63	296
Spalisoma rubripinne	13	33	34	30	66	22	45	49	292
Hoplostethus mediterraneus	12	22	112	11	17	1	27	17	299

<i>Pomacentrus</i>	6	22	26	16	44	94	25	63	296	
<b>St.Croix, VI – 220.890 fish</b>	13	33	34	30	66	22	45	49	292	
<i>Haemulon sciurus</i>	12	33	119	14	17	4	25	15	239	
<i>Haemulon melanurum</i>		200	1		5	3		3	212	
<i>Haemulon chrysargyreum</i>	3	6	116	20	20	36	2	2	205	
<i>Haemulon carbonarium</i>		27	22	42	4	35	10	1	141	
<i>Lutjanus mahogoni</i>	14	19	27	26	4	39	5		134	
<i>Sparisoma chrysopterum</i>	19	7	45	12	18	17	9	4	131	
<i>Lutjanus apodus</i>	8	17	13	18	11	14	15	9	105	
<i>Sphyraena barracuda</i>	9	9	11	9	10	13	10	33	104	
<i>Scarus UNK</i>	94		5			4			103	
<i>Cephalopholis cruentata</i>	8	15	13	16	21	8	10	11	102	
<i>Lutjanus synagris</i>	7	22	12	3	4	12	17	17	94	
<i>Lutjanus analis</i>	7	7	7	5	13	10	3	12	64	
<i>Lutjanus griseus</i>	10	4	10	2		27	10	1	64	
<i>Haemulon macrostomum</i>	5	40	6	2		1			54	
<i>Scomberomorus regalis</i>	3		3	1	3	1		4	15	
<i>Scarus guacamaia</i>	12		2						14	
<i>Sparisoma UNK</i>				4	3			3	10	
<i>Epinephelus adscensionis</i>	1					6	2		9	
<i>Haemulon album</i>			4			1			5	
<i>Anisotremus surinamensis</i>				2			1	1	4	
<i>Anisotremus virginicus</i>			1	1		1		1	4	
<i>Lutjanus UNK</i>	1							3	4	
<i>Epinephelus striatus</i>					1	2			2	

# Jurisdiction Reef Fish Surveys



St Thomas



St Croix

# Reef Fish (cont.)

- **REEF and AGRRA surveys (more from Christy)**
  - Volunteer diver surveys – Expert and novice
  - Transects and roving diver surveys
  - Broad geographic coverage
- **Monitoring Reef Ecology, Coral Disease and Restoration (NOAA Fisheries SEFSC)**
  - Western PR including Mona and Desecheo – 1997 to present
  - Paired benthic and fish surveys
- **Coral Reef Ecosystem Studies (University of Puerto Rico-Mayagüez)**
  - St. Thomas (MCD), La Parguera – 2001-2009
  - Variety of projects, permanent (forereef) fish transects
- **PR Deep Reef Surveys (UPRM, contracted by CFMC)**
  - UPR-West and east PR – 2003-2007

# Reef Fish (cont.)

- **AUV surveys**
  - VI – one shot survey (so far)
  - Focused geographic coverage
- **Oregon 2: 2009 Cruise**
  - PR/VI including Mona and Desecheo
  - 50-150 m; longline and traps
- **MRAG and STFA by-catch surveys (VI)**
  - Quantified bycatch by fishery/gear – 1-3 yrs total
  - Data available in TIP and as comparisons to CCR
- **Deep CRES (UPR)**